

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (currently amended) A process for making a catalyst comprising:
altering the precipitation of a catalyst component from a catalyst synthesis solution by controlling the viscosity of a catalyst synthesis solution with the addition of aluminum ~~alkyls~~ hydrocarbyl or substituted hydrocarbyl moieties, wherein the average particle size of the catalyst component increases with an increased concentration of aluminum alkyl in the synthesis solution.
2. (original) The process of claim 1 further comprising contacting the catalyst component with an organometallic preactivating agent to form a catalyst, wherein the average particle size of the catalyst increases with an increased concentration of aluminum alkyl in the synthesis solution.
3. (currently amended) The process of claim 1 ~~wherein the catalyst synthesis solution comprises~~ additionally comprising:
contacting a magnesium dialkoxide compound with a halogenating agent to form a reaction product A; and
contacting reaction product A with a series of halogenating/titanating agents to form a catalyst component; and
contacting the catalyst component with an organometallic preactivating agent to form a catalyst; wherein the average particle size of the catalyst increases with an increased concentration of aluminum alkyl in the synthesis solution.
4. (original) The process of claim 3 wherein at least one of reaction product A and the resulting reaction products after each halogenating/titanating step are washed with a solvent to remove contaminants.
5. (currently amended) A process for making a catalyst comprising:

a) contacting a magnesium dialkoxide compound with a halogenating agent to form a reaction product A;

b) contacting reaction product A with a first halogenating/titanating agent to form reaction product B;

c) contacting reaction product B with a second halogenating/titanating agent to form reaction product C; and

d) contacting reaction product C with a third halogenating/titanating agent to form reaction product D; and

e) contacting reaction product D with an organometallic preactivating agent to form a catalyst; wherein the magnesium dialkoxide compound is a ~~the~~ reaction product of a ~~reaction comprising~~ a magnesium alkyl compound of the general formula MgRR', wherein R and R' are alkyl groups of 1-10 carbon atoms and ~~may be~~ are the same or different, an alcohol of the general formula R"OH wherein the alcohol is linear or branched and wherein R" is an alkyl group of 2-20 carbon atoms, and an aluminum ~~alkyl~~ hydrocarbyl or substituted hydrocarbyl moieties of the formula AlR'''₃, wherein at least one R''' is an alkyl or alkoxide having 1-8 carbon atoms ~~or a halide~~, and wherein each R''' ~~may be~~ is the same or different; and wherein the average particle size of the catalyst increases with an increased aluminum alkyl to magnesium alkyl ratio.

6. (original) The process of claim 5 wherein the ratio of aluminum alkyl to magnesium alkyl is in the range of about 0.01:1 to about 10:1.

7. (currently amended) The process of claim 5 wherein the halogenating/titanating agents of steps c) and d) each comprise titanium tetrachloride as the halogenating/titanating agents and the titanium tetrachloride to magnesium alkyl ratio is in the range of about 0.1 to about 5.

8. (currently amended) The process of claim 6 wherein the magnesium dialkoxide compound is a magnesium di(2-ethylhexoxide).

9. (original) The process of claim 5 wherein the alkyl magnesium compound is diethyl

magnesium, dipropyl magnesium, dibutyl magnesium or butylethylmagnesium.

10. (original) The process of claim 5 wherein the alcohol is selected from the group consisting of ethanol, propanol, isopropanol, butanol, isobutanol, 2-methyl-pentanol, and 2-ethylhexanol.

11. (original) The process of claim 5 wherein the organometallic preactivating agent comprises an aluminum alkyl.

12. (original) The process of claim 5 wherein the first halogenating/titanating agent is a blend of two tetra-substituted titanium compounds with all four substituents being the same and the substituents being a halide or an alkoxide or phenoxide with 2 to 10 carbon atoms.

13. (original) The process of claim 12 wherein the first halogenating/titanating agent is a blend of a titanium halide and an organic titanate.

14. (original) The process of claim 13 wherein the first halogenating/titanating agent is a blend of $TiCl_4$ and $Ti(OBu)_4$ in a range from 0.5:1 to 6:1 $TiCl_4/Ti(OBu)_4$.

15. (currently amended) The process of claim 5 wherein the reaction further comprises contacting the magnesium dialkoxide and halogenating agent with an electron donor.

16. (currently amended) The process of claim 15 wherein the ratio of electron donor to magnesium dialkoxide is in the range of about 0:1 to about 10:1.

17. (original) The process of claim 15 wherein the electron donor is an ether.

18. (currently amended) The process of claim 5 wherein the halogenating agent is of the general formula $ClAR''_x$, wherein A is a nonreducing oxyphilic compound atom, R'' is a hydrocarbyl or substituted hydrocarbyl moiety having from about 2 to 6 carbon atoms, and x is the valence of A.

minus 1.

19. (original) The process of claim 18 wherein the halogenating agent is $\text{ClTi(O}^{\text{I}}\text{Pr})_3$.

20. (currently amended) The process of claim 5 wherein at least one of the reaction products A, B, C and D are washed with a hydrocarbon solvent by agitation of the reaction product in the solvent, allowing the reaction product to settle and decanting the solvent, until titanium species [Ti] content is less than about 100 mmol/L in the decanted solvent.

21. (currently amended) The process of claim 5 wherein an electron donor is present in any one or more of steps a), b), c), or d), and wherein the ratio of electron donor to metal magnesium alkyl is in the range of about 0:1 to about 10:1.

22. (original) The process of claim 5 further comprising placing the catalyst of the invention on an inert support.

23. (original) The process of claim 22 wherein the inert support is a magnesium compound.

24. (currently amended) A catalyst produced by a process comprising:

- a) contacting a catalyst component with an organometallic preactivating agent, wherein the catalyst component is produced by a process comprising:
 - i) contacting a magnesium dialkoxide compound of the general formula $\text{Mg(OR}^{\text{II}}\text{)}_2$ with a halogenating agent capable of exchanging one halogen for one alkoxide to form a reaction product A, where R^{II} is a hydrocarbyl or substituted hydrocarbyl having from 1 to 20 carbon atoms;
 - ii) contacting reaction product A with a first halogenating/titanating agent to form reaction product B;
 - iii) contacting reaction product B with a second halogenating/titanating agent to form reaction product C; and

iv) contacting reaction product C with a third halogenating/titanating agent to form a catalyst component;

wherein the magnesium dialkoxide compound is ~~a~~ the reaction product of a reaction comprising a magnesium alkyl compound of the general formula MgRR', wherein R and R' are alkyl groups of 1-10 carbon atoms and ~~may be~~ are the same or different, an alcohol of the general formula R"OH wherein the alcohol is linear or branched and wherein R" is an alkyl group of 2-20 carbon atoms, and an aluminum alkyl of the formula AlR'''₃ wherein at least one R''' is an alkyl or alkoxide having 1-8 carbon atoms ~~or a halide~~, and wherein each R''' ~~may be~~ is the same or different; and wherein the average particle size of the catalyst increases with an increased aluminum alkyl to magnesium alkyl ratio.

25. (currently amended) The catalyst of claim 24 wherein the organometallic preactivating agent is an aluminum alkyl of the formula AlR₃ wherein at least one R is an alkyl having 1-8 carbon atoms ~~or a halide~~, and wherein each R ~~may be~~ is the same or different.

26. (original) The catalyst of claim 25 wherein the organometallic preactivating agent is a trialkyl aluminum.

27. (original) The catalyst of claim 24 wherein the second and third halogenating/titanating agents comprise titanium tetrachloride.

28. (currently Amended) The catalyst of claim 24 wherein the ratio of aluminum to titanium is in the final product is in the range from 0.1:1 to 2:1.

Claims 29-36 Cancelled.

COMMENTS/ARGUMENTS

The Examiner noted that the claims as originally filed omitted claim5 and instructed the Applicants to renumber the claims accordingly. The claims have been renumbered as required by the Examiner. Since this is not an amendment per se, the renumbering has not been shown to be amendments.

During a phone conversation with the Examiner, David Alexander made an election to prosecute group 1, Claims 1-28. The Applicants hereby affirm that election.

The specification stands as objected to because of the issuance of the parent case referenced in the specification by its serial number only. Paragraph [0001] of the application has been amended to indicate the patent number and issue date of the parent case. It is the Applicants' position that this objection is now moot and the claims are in condition for allowance in view of same.

Claims 1-28 stand as rejected under the doctrine of obviousness type double patenting over US Patent Nos 6,174,971; 6,486,274; and 6,693,058. The Applicants respectfully assert that the present application and the cited patents all are commonly owned. By virtue of the terminal disclaimer filed concurrently herewith, the Applicants believe that the claims are now in condition for allowance in regard to this rejection.

Claims 1-28 stand as rejected under 35 U.S.C. §112, second paragraph for the following issues:

In Claim 1, line 4 requires alkyls but it is not clear whether the plural is appropriate. The term alkyls have been replaced with hydrocarbyl or substituted hydrocarbyl moieties.

In Claim 3, line 1, there is a recitation of solution, but the next three clauses are to process steps. Claim 3 has been amended to eliminate the reference to solution in the preamble.

In Claim 5, the term "reaction comprising a magnesium alkyl" is a non-sequitur. This term has been amended in Claim 5.

In Claim 5, the term "may be" is indefinite. This term has been amended in Claim 5. Please note that the other instances of this term have also been amended and further rejections treated as moot.

In Claim 5, the term "aluminum alkyl" is indefinite. This term has been amended in Claim 5.

Claim 6 is not clear because it is unclear whether a cited ratio is to a product or to reagents. The ratio is a ratio of reactants because the product is no longer an alkyl after the alcohol reaction. Please note that the other instances of this term have also been amended and further rejections treated as moot.

Claim 7 is unclear because the steps do not comprise physical entities. Claim 7 has been amended to overcome this rejection.

Claim 8 should be amended to delete the term "a." Claim 8 has been amended according to the Examiner's directions.

Claim 12 is rejected because it is unclear whether the term "first halogenating/titanating agent" is a blend of two titanium compounds and implies that the agent is either a halogenating agent or a titanating agent but not both simultaneously. The terms first and second halogenating/titanating agent are defined in the specification. At paragraph 46, the first agent is defined as: "The first halogenation/titanation agent is typically a mild titanation agent,

which can be a blend of a titanium halide and an organic titanate." At paragraph 52, the second agent is defined as: "Generally, the second and third halogenation/titanation agents comprise titanium tetrachloride." In other words, the first halogenating/titanating agent will titanate and may (or may not) halogenate.

It is not clear in Claim12 whether the phrase "blend of two tetra-substituted titanium compounds" require that the compounds be different. It was the intent of the applicant that phrase "blend of two tetra-substituted titanium compounds" mean two different compounds.

Claim 15 is a non-sequitur regarding the phrase "reaction further comprises." Claim 15 has been amended to correct this issue.

Claim 16 is unclear in regard to the reference of a recited ratio. This claim has been amended to resolve this issue.

Claim 18 is unclear in the use of the same symbol "R" for two different moieties and the use of A for a compound. This claim has been amended as to resolve the issue of the R symbol and the A symbol has been replaced with the term "element."

Claim 20 is unclear in how washing is to be carried out and Ti to be measured. This claim has been amended to include the steps used in the Example.

Claim 21 is unclear in regard to the reference of a recited ratio. This claim has been amended to resolve this issue.

Claim 24 is unclear in the use of the same symbol "R" for two different moieties. This claim has been amended as to resolve the issue of the R symbol use.

In Claim 24, the term "reaction comprising a magnesium alkyl" is a non-sequitur. This term has been amended in Claim 24.

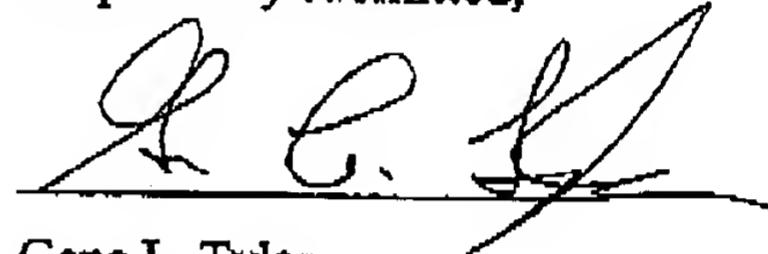
In Claim 25, the use of the symbol R is unclear regarding whether it is the same or different from the use of the same symbol in the independent claim from which it pends. In Claim 24, as now amended, R is an alkyl group of from 1-10 carbon atoms. In Claim 25, the maximum size of the alkyl group is 8 carbons. In this claim, the R has been limited to a subset of the compounds defined in Claim 24 and is believed to be a proper use of same.

Claim 28 is unclear in regard to the reference of a recited ratio. This claim has been amended to resolve this issue.

SUMMARY

The Examiner is requested to withdraw his rejection of the Claims as amended in view of the above amendments and arguments. Allowance of Claims 1-28 is respectfully requested.

Respectfully submitted,



Gene L. Tyler
Reg. No. 35,395
Madan, Mossman & Sriram
2603 Augusta
Suite 700
Houston, Texas 77057
(713) 266-1130 x 122 Tel
(713) 266-8510 Fax

Date: July 23, 2004